

# Bohr Models

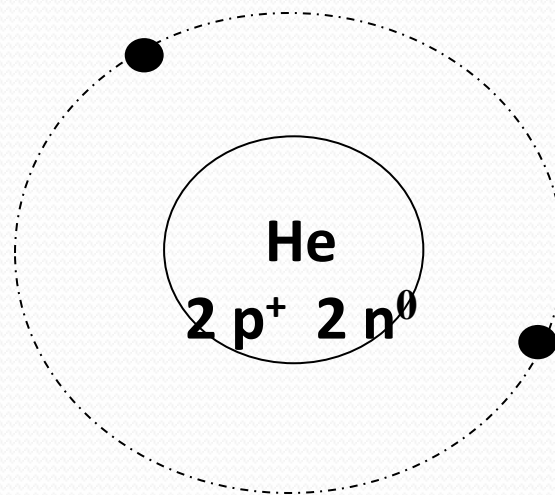
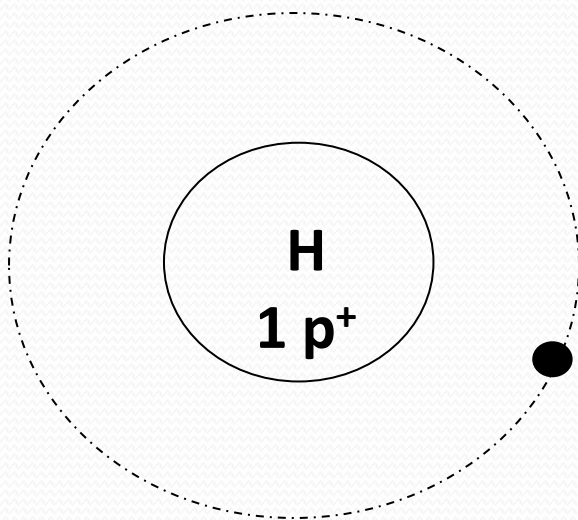
# Reading the Periodic Table

- For the first **20** elements of the periodic table you can “read” how the **electrons** are **arranged** around the nucleus.
- **Rows** represent **levels** (or layers) of the orbital.
- **Columns** represent each electron added.

# Bohr model of atoms!

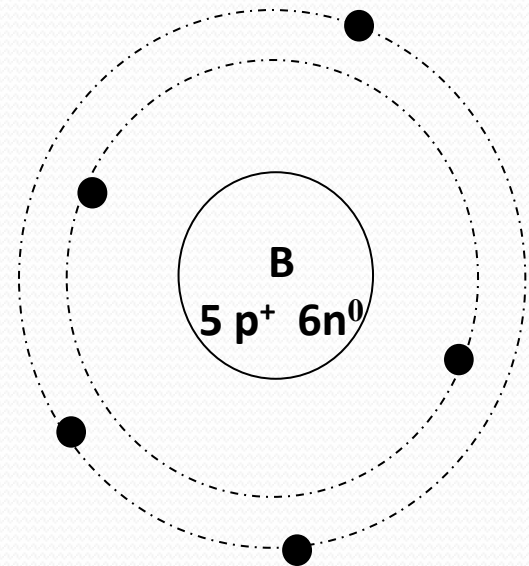
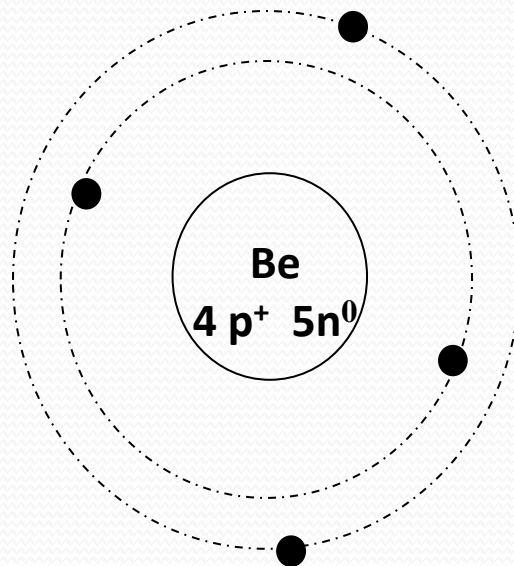
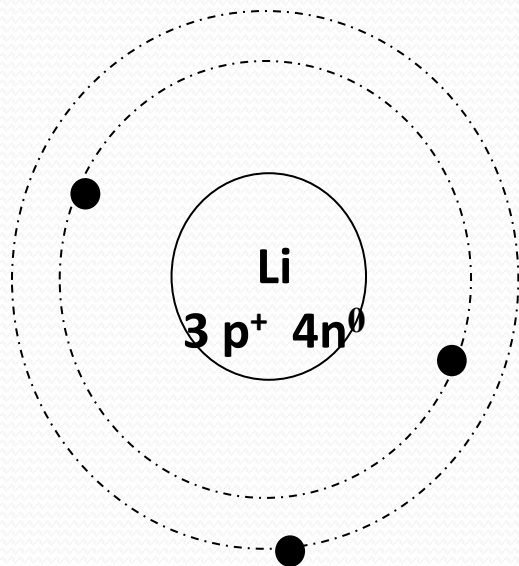
## 1<sup>st</sup> Row

- The first energy level can only hold **two** electrons. So there are only two elements in the first **row** (hydrogen and helium).



## 2<sup>nd</sup> Row:

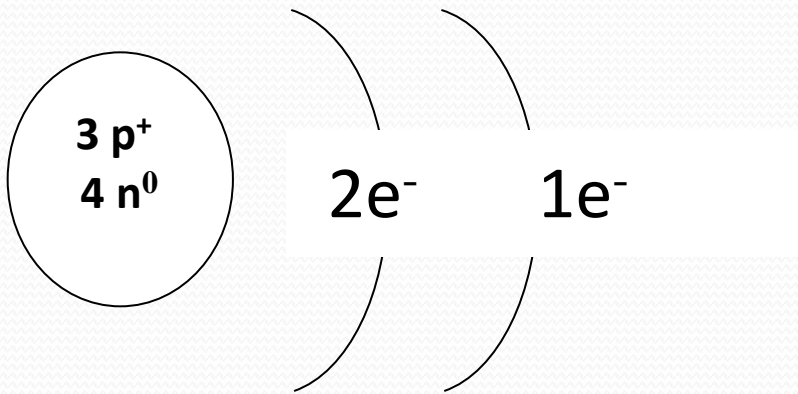
- The second energy level can hold **eight** electrons (2 columns + 6 more columns). So there are eight **elements** in the second row. Here are the first three:



# Short hand drawings!

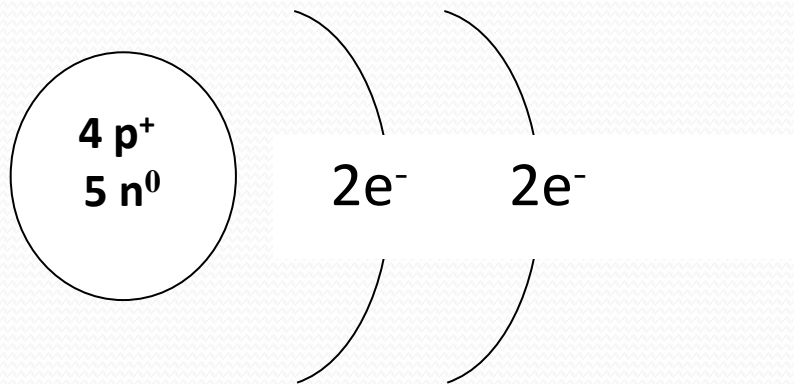
- Instead of continuing to draw all these circles a **Bohr** diagram simplifies things for us. A Bohr **diagram** just shows the **nucleus** and indicates how many **electrons** are in each **level**.

Lithium atom

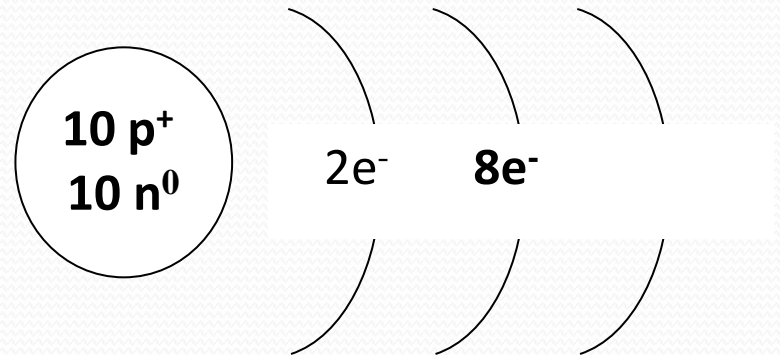


# More atoms!

Beryllium atom



Neon atom

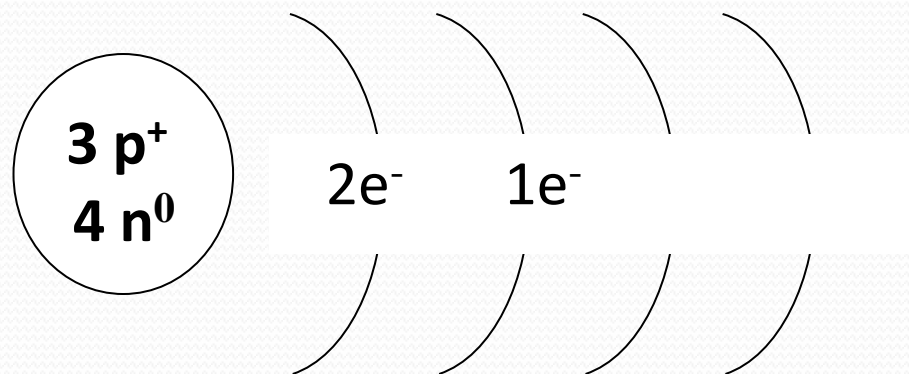


# Atom vs. Ions

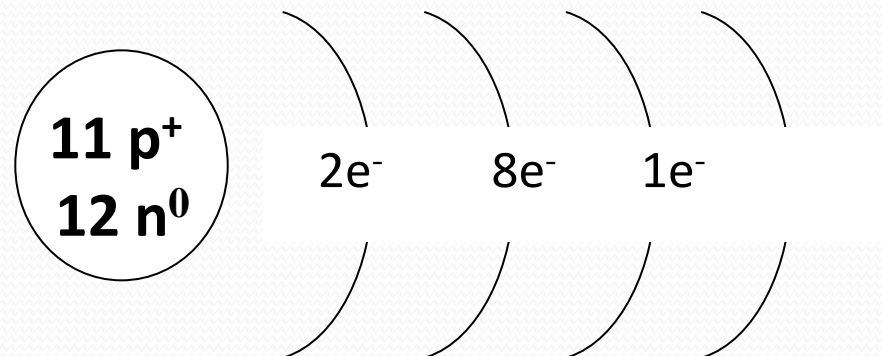
- Ions
- When an atom **gain** or **lose** an electron it becomes an “**ion**”. Recall the valence electrons are involved in a chemical reaction. So it is the **valence** electrons that are gained or lost.

Consider the valence level of the following **alkali** metals:

- Each of the Alkali metals has **one** electron in its outermost level. The atom becomes more **positive** if it can get rid of that one outer electron.
- If the atom is able to **give** the outer electron away it becomes **positive** in charge. It will have one more proton than electrons.
- Thus it is an **ion** with **2+** charge.



Lithium



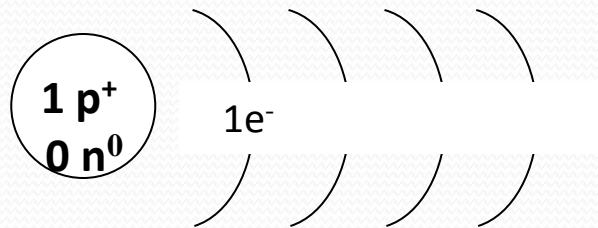
Sodium



Fill in the following Bohr diagrams for the Alkali metal atoms and their ions. The first pair are already done.

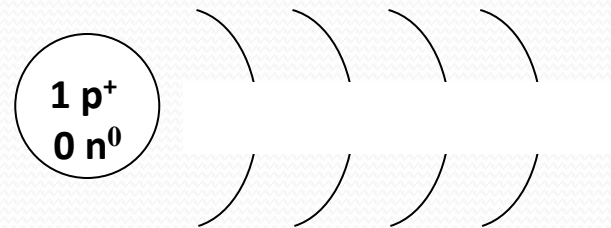
## Atoms

H

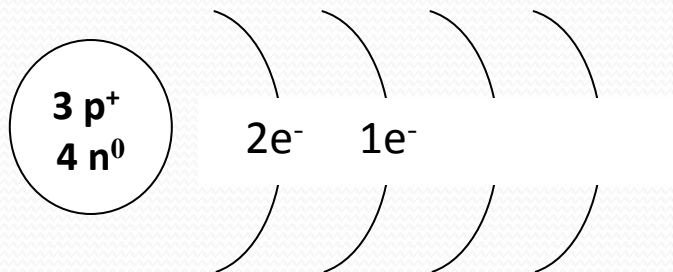


## Ions

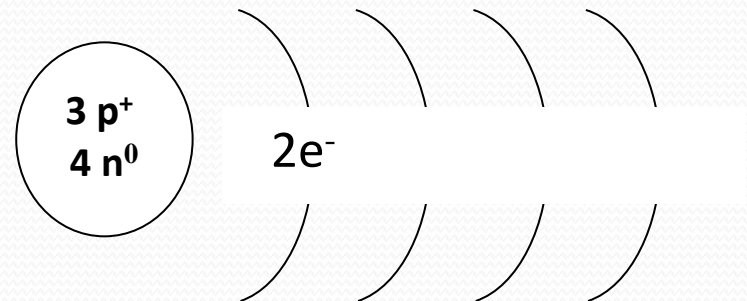
$\text{H}^+$



Li

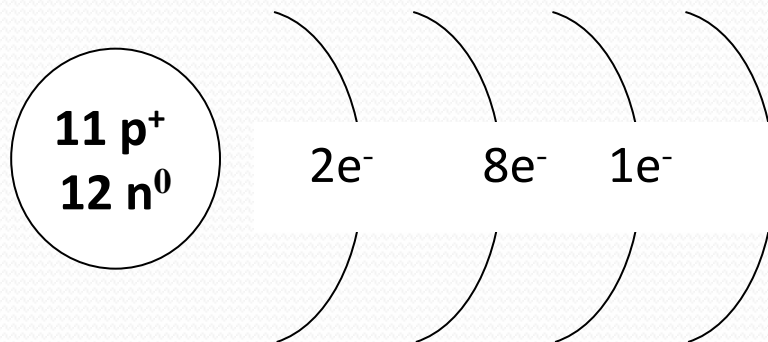


$\text{Li}^+$

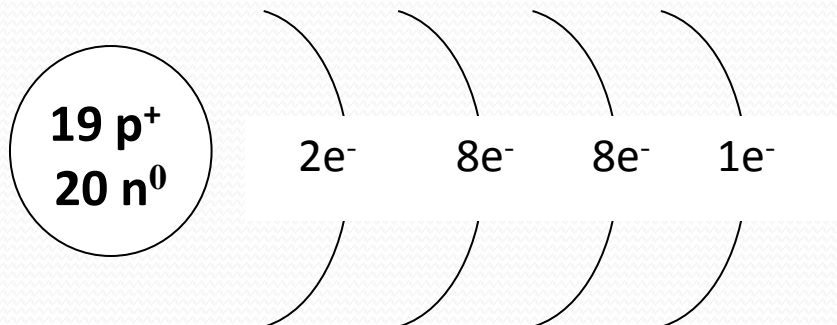


# Atoms

Na

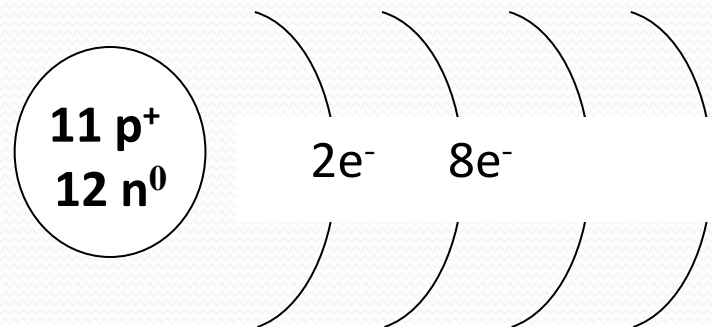


K

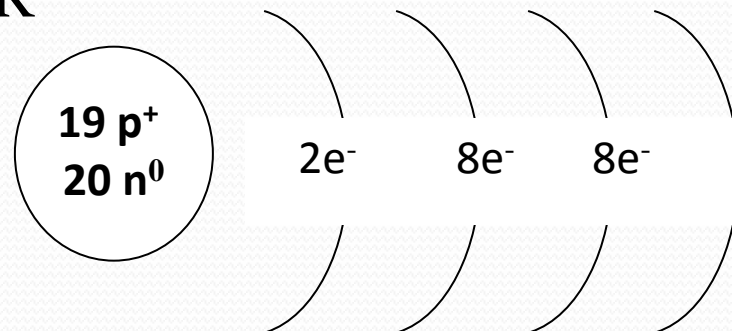


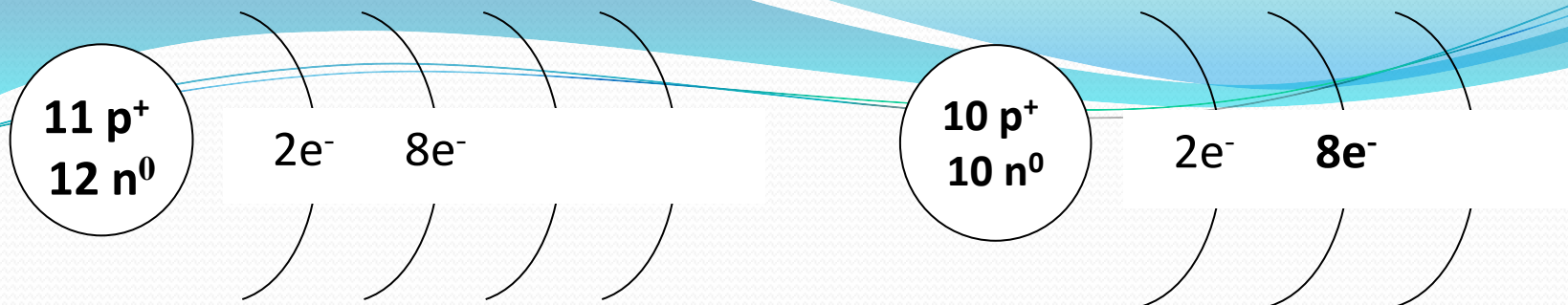
# Ions

$\text{Na}^+$



$\text{K}^+$





Sodium Ion ( $\text{Na}^+$ )

Neon Atom ( $\text{Ne}$ )

- The term **isoelectronic** refers to atoms that have the **same electron** arrangement as another atom.
- Notice that the ions form electron arrangements that are the exact same as the nearest **Noble Gas**.

- Again, notice that the ions form electron arrangements that are the exact **same** as the **nearest** Nobel Gas.
- Fill in the table for the how many protons and electrons each of the following has?

Atom/Ion	#p <sup>+</sup>	#e <sup>-</sup>	Atom/Ion	#p <sup>+</sup>	#e <sup>-</sup>	Atom/Ion	#p <sup>+</sup>	#e <sup>-</sup>
H <sup>-</sup>	1	2	F <sup>-</sup>	9	10	Cl <sup>-</sup>	17	18
He	2	2	Ne	10	10	Ar	18	18
Li <sup>+</sup>	3	2	Na <sup>+</sup>	11	10	K <sup>+</sup>	19	18

Fill in the following Bohr diagrams for the Halogen non-metal atoms and their ions. First pair are already done.

